Department of consumer and corporate affairs / Ministère de la consommation et des corporations

STANDARDS BRANCH - DIRECTION DES NORMES

NOTICE OF APPROVAL E-52-1

OTTAWA December 9, 1968

LANDIS & GYR TYPE "2FF8/VA/2FF8Ø" DUPLEX TRIVECTORS

	Apparatus
Current Range	0.12 - 10 amperes
Voltage	115 volts
Phase	3
Wire	3
Elements	2
Test Period	15 minutes
Frequency	60 hz
No. of Circuits Totalized	2
Power Factor Range	1.0 to zero lagging
Multiplier Ratio *	
Meter Burdens	
Type FF8 (each meter)	Voltage Coil 1.2 w 4.9 va
	Current Coil 0.9 w 1.4 va
Type FF8Ø (each meter)	Voltage Coil 2.1 w 2.3 va
	Current Coil 1.3 w 1.5 va

* "Multiplier Ratio" is the ratio between the instrument transformer multiplier of line 1 and the instrument transformer multiplier of line 2. See section marked "*" in the description.

Description

The basic elements in the Duplex Trivector are identical to those used in the single Trivector receiving approval under S-EA.551 which contained a single 2-element active energy meter (FF8) and a

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single reactive energy meter (FF8Ø) in the case along with a Trivector mechanism located between them and producing a readout of "va" on the demand scale and "Kvah" on the register.

The Duplex Trivector contains two such sets of measuring elements, each with its own "watt" and "var" demand dials and "Kwh" and "Kvarh" registers.

These are identified as "line 1" and "line 2" for the meters located at the bottom and top of the casing, respectively.

The individual watt demands of lines 1 and 2 are mechanically totalized and read out on another "watt" demand dial marked "Total" and also the individual "var" demands of lines 1 and 2 are totalized and read out on another separate "var" demand dial also marked "Total".

The readings of the "Total" watt demand dial and those of the "Total" var demand dial are fed into the Trivector mechanism and appear as an indication on another demand dial as "Voltamperes".

Similarly, the kwh readings of lines 1 and 2 are totalized on a register inset in the "Total" watt demand dial, and the kvarh readings of lines 1 and 2 are totalized on a register inset in the "Total" var demand dial.

The totalized Kwh and Kvarh are fed into the Trivector mechanism and appear on a register inset in the voltampere demand dial as kilovoltamperehours.

The purpose of the Duplex Trivector is to give the individual watt demand, individual kilowatt hours, individual reactive voltampere demand and individual reactive kilovoltamperehours of two separate lines and to totalize separately the foregoing quantities and to give a readout in vectorial voltamperes and kilovoltamperehours.

* In the original circular "E-52" the Duplex Trivector was supplied from the secondaries of instrument current and voltage transformers in lines 1 and 2 that had the same nominal ratio and hence the same multiplier. This common multiplier would then be applied to all readings and indications.

To take care of installations where the overall multipliers of lines 1 and 2 are not the same, a reduction gear box is provided for the top meters (line 2) ahead of the totalizing differential.

The top meters will always have a primary multiplier equal to or lower than the bottom meters. For example, a multiplier ratio or 0.5 means that the overall transformer multiplier of line 2 feeding the top meters is half the overall transformer multiplier of line 1 feeding the bottom meters.

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The secondary constants of each meter remain unaltered and the two watthour meters may be connected in series for dial testing and similarly the varhour meters.

In the case of those Trivectors that do not have a "Multiplier ratio" marked for the upper meters, the test dial on the "Total" register will indicate the sum which would be twice the individual meter test dial registration.

On secondary reading (transformer type) Duplex Trivectors, that have e.g., the words "multiplier ratio 0.5" marked, the "Total" register will not indicate the sum but will be less. In this particular case, the test dial on the "Total" register for 1 test dial revolution of line 1 and line 2 meters will register $1\frac{1}{2}$ in place of 2 revolutions. This is made up of $\frac{1}{2}$ revolution for the top meter plus 1 revolution from the bottom meter.

NOTE:

This point is to be checked when verifying, and may be done simply by energizing the upper meter only. The ratio between the "Total" test dial revolutions and the upper meter test dial revolutions should be the "multiplier ratio".

The same effect will be noticed in the demand indications, so that if a load is applied to cause the upper meter to indicate 1000, the Total demand dial will indicate 500. If the same load were to be applied to both upper and lower meters simultaneously, the indication on the "Total" demand dial would be 1500.

The three paragraphs immediately preceding are not applicable to primary reading (transformer rated) Duplex Trivectors.

The Duplex Trivector is to be considered as having two 2-element watthour meters and two 2-element varhour meters.

A diagram attached to the side of the case indicates the two lines and the connections from the secondaries of the transformers to the various terminals.

In all cases, the line having the lower overall multiplier is to be connected to the top meters if the words "multiplier ratio" appears.

Duplex Trivectors marked with the words "multiplier ratio" are only approved for use where the overall transformer multipliers of each line match the multiplier ratio.

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This Duplex Trivector is approved for use with any suitable approved Landis & Gyr attachments, which when incorporated, will appear in the type designation, e.g., (2FF8hm)mr4/VAmyer4/(2FF8Øhm)m which means - two FF8 type elements, each with reverse running stop (h), each with maximum demand attachment (m); totalizing maximum demand (m); transmitting contacts (r4); (watthours per contact on a small nameplate); following the oblique stroke, VA indicates the Trivector function, (m) the maximum demand indicator, (ye) indicates the demand timing unit, (r4) the transmitting contact;(voltamperehours per contact on a small nameplate); following the second oblique stroke (2FF8Ø) indicates two reactive energy meters, each with reverse running stop (h) and maximum demand attachment (m); and a totalizing maximum demand (m).

The (ye) demand timing unit permits all maximum demand mechanisms to return to zero simultaneously.

The Duplex Trivector is available with either English or French nameplates.

All Duplex Trivectors marketed after the date of this circular will carry a label similar to the following:

> This instrument for use only where primary multiplier of line #2 (top meters) is equal to [ ] times the primary multiplier of line #1 (bottom meters).

The illustrations on this circular are the same as those used on circular E-52 and show a Duplex Trivector having a multiplier ratio of 1.

The illustration does no show the required label.

Approval granted to:

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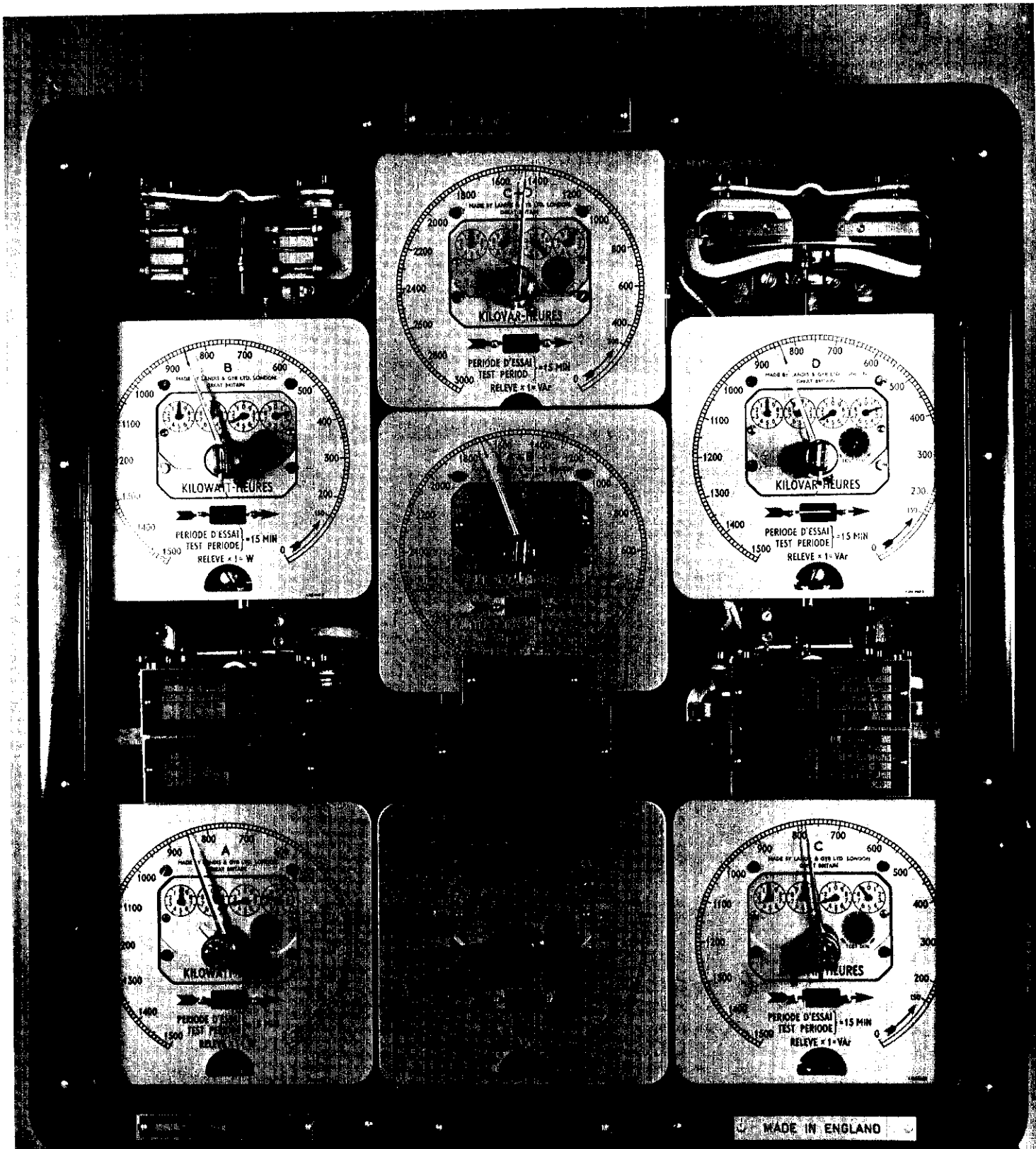

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